

## REMARKS

Claims 1-25 are pending and under consideration. In the Office Action of January 13, 2005, the Examiner made the following disposition:

- A.) Objected to the Title of the Invention.
- B.) Rejected claims 1-2, 4-5, 10, 14-15, 18-21, and 24-25 under 35 U.S.C. §102(b) as being allegedly anticipated by *Merrill*.
- C.) Rejected claims 3 and 16 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Burr et al.*
- D.) Rejected claims 7-9, 11-13, 17, and 23 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Nakagawa et al.*
- E.) Rejected claims 6 and 22 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Matsumoto*.

Applicants respectfully traverse the rejections and address the Examiners disposition below.

A.) Objection to the Title of the Invention:

The Title of the Invention has been amended as per the Examiner's request to overcome the objection.

Applicants respectfully submit the objection has been overcome and request that it be withdrawn.

B.) Rejection of claims 1-2, 4-5, 10, 14-15, 18-21, and 24-25 under 35 U.S.C. §102(b) as being allegedly anticipated by *Merrill*:

Applicants respectfully disagree with the rejection.

Regarding claims 1-2 and 14-15:

Independent claims 1 a solid-state image pickup device including pixels each of which comprises a photodiode, a detection portion and a transfer transistor for transferring charges accumulated in the photodiode to the detection portion. The gate voltage of the transfer transistor when the charges are accumulated in the photodiode is set to a negative voltage.

Claim 14 claims a method of driving a solid-state image pickup device similar to the device of claim 1.

This is clearly unlike *Merrill*, which fails to disclose or even suggest a gate voltage of a transfer transistor that is set to a negative voltage when charges are accumulated in a photodiode. The Examiner argues that *Merrill* allegedly describes a negative voltage being applied to a photogate (PG) and cites *Merrill* Figure 1, item 18, and *Merrill* 2:7-9. However, that disclosure from *Merrill* relates to a signal charge read-out period, not a charge accumulation period as required by claims 1 and 14. When the passage cited by the Examiner is read in context, that portion of *Merrill* clearly describes a signal charge read-out period. (See, *Merrill* 1:58-2:23).

In a passage located above the passage cited by the Examiner, *Merrill* clearly states that a positive voltage is applied to its photogate 18 during a charge accumulation period:

The operation of cell 10 begins with an integration period during which light energy in the form of photons penetrates substrate 12 and forms a number of electron-hole pairs. Throughout this integration period, a *positive voltage* is applied to photogate 18 via photogate signal PG.

*Merrill* 1:50-55 (emphasis added). In any case, the positive voltage is being applied to *Merrill*'s photogate, not to a gate of a transfer transistor. Nowhere does *Merrill* even suggest a gate voltage of a transfer transistor that is set to a negative voltage when charges are accumulated in a photodiode. Therefore, for at least this reason, *Merrill* fails to disclose or even suggest claims 1 and 14.

Claims 2, 15, 18 and 19 depend directly or indirectly from claims 1 and 14 and are therefore allowable for at least the same reasons that claims 1 and 14 are allowable.

Regarding claims 4 and 20:

Independent claim 4, as amended, claims a solid-state image pickup device including pixels each of which comprises a photodiode, a detection portion and a transfer transistor for transferring charges accumulated in the photodiode to the detection portion. The gate voltage of the transfer transistor when the charges are accumulated in the photodiode is set to a positive voltage. Referring to Applicants' Figure 5 as an illustrative example, the gate electrode 48 of the transfer transistor Q<sub>T</sub> is positioned beside a light-receiving surface PD.

Claim 20 claims a method of driving a solid-state image pickup device similar to the device of claim 4.

This is clearly unlike *Merrill*, which fails to disclose or even suggest a gate electrode of a transfer transistor that is positioned beside a light-receiving surface. Referring to *Merrill* Figure 1, *Merrill* teaches a transfer transistor 26 that is electrically coupled via a lead to a detection portion 16. Thus, unlike claims 4 and 20, *Merrill's* transfer transistor gate is not positioned beside a light-receiving surface. For at least this reason, *Merrill* fails to disclose or even suggest claims 4 and 20.

Claims 5, 21, 24, and 25 depend directly or indirectly from claims 4 or 20 and are therefore allowable for at least the same reasons that claims 4 and 20 are allowable.

Regarding claim 10:

Claim 10 claims a solid-state image pickup device including pixels each of which comprises a photodiode, a detection portion and a transfer transistor for transferring charges accumulated in said photodiode to the detection portion. An overflow path for discharging charges overflowing from the photodiode is formed in a bulk out of a channel portion of the transfer transistor.

This is clearly unlike *Merrill*, which fails to disclose or even suggest Applicants' claimed overflow path. The Examiner cites *Merrill* 2:10-16 as allegedly describing an overflow path, however, Applicants respectfully disagree. *Merrill* 2:10-16 fails to even relate to overflow, and instead merely describes read-out of a signal charge. As is known in the art, the signal charge necessary for an image signal is not overflowed. Instead, the signal charge is read out, as described in *Merrill* 2:10-16. Thus, for at least this reason, *Merrill* fails to disclose or even suggest claim 10.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

C.) Rejection of claims 3 and 16 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Burr et al.*:

Applicants respectfully disagree with the rejection.

Claims 1 and 14 are allowable over *Merrill* as discussed above. *Burr* still fails to disclose or suggest a gate voltage of a transfer transistor that is set to a negative voltage when charges are

accumulated in a photodiode. Therefore, *Merrill* in view of *Burr* still fails to disclose or suggest claims 1 and 14.

Claims 3 and 16 depend directly or indirectly from claims 1 and 14 and are therefore allowable for at least the same reasons that claims 1 and 14 are allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

D.) Rejection of claims 7-9, 11-13, 17, and 23 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Nakagawa et al.*:

Applicants respectfully disagree with the rejection.

Regarding claims 7-9 and 23:

Claims 4 and 20 are allowable over *Merrill* as discussed above. *Nakagawa* still fails to disclose or suggest a gate electrode of a transfer transistor that is positioned beside a light-receiving surface. Therefore, *Merrill* in view of *Nakagawa* still fails to disclose or suggest claims 4 and 20.

Claims 3 and 16 depend directly or indirectly from claims 4 or 20 and are therefore allowable for at least the same reasons that claims 4 and 20 are allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

Regarding claims 11-13:

Claim 10 is allowable over *Merrill* as discussed above. *Nakagawa* still fails to disclose or suggest Applicants' claimed overflow path. Therefore, *Merrill* in view of *Nakagawa* still fails to disclose or suggest claim 10.

Claims 11-13 depend directly or indirectly from claim 10 and are therefore allowable for at least the same reasons that claim 10 is allowable.

Regarding claim 17:

Claim 14 is allowable over *Merrill* as discussed above. *Nakagawa* still fails to disclose or suggest a gate voltage of a transfer transistor that is set to a negative voltage when charges are

accumulated in a photodiode. Therefore, *Merrill* in view of *Nakagawa* still fails to disclose or suggest claim 14.

Claim 17 depends directly or indirectly from claim 14 and is therefore allowable for at least the same reasons that claim 14 is allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

E.) Rejection of claims 6 and 22 under 35 U.S.C. §103(a) as being allegedly unpatentable over *Merrill* in view of *Matsumoto*:

Applicants respectfully disagree with the rejection.

Claims 4 and 20 are allowable over *Merrill* as discussed above. *Matsumoto* still fails to disclose or suggest a gate electrode of a transfer transistor that is positioned beside a light-receiving surface. Therefore, *Merrill* in view of *Matsumoto* still fails to disclose or suggest claims 4 and 20.

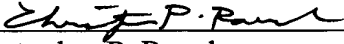
Claims 6 and 22 depend directly or indirectly from claims 4 or 20 and are therefore allowable for at least the same reasons that claims 4 and 20 are allowable.

Applicants respectfully submit the rejection has been overcome and request that it be withdrawn.

CONCLUSION

It is submitted that claims 1-25 are patentable and that the application is in condition for allowance. Notice to that effect is requested.

Respectfully submitted,

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